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USE OF INSECTICIDES IN SOUTHERN PINE SEED ORCHARDS DURING 1978

U. S. FOREST SERVICE
PINEVILLE, LOUISIANA

SOUTHEASTERN AREA, STATE & PRIVATE FORESTRY
USDA FOREST SERVICE, ATLANTA, GA 30309

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Compiled by

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INTRODUCTION

During 1978 a questionnaire concerning insecticide use was sent to all seed orchard managers by the three tree improvement cooperatives-- 1) the North Carolina State Cooperative, 2) the Florida Cooperative, and 3) the Western Gulf Cooperative. A total of 54, or approximately 50 percent, of the orchard managers solicited responded to the questionnaire. Forest Insect and Disease Management (FI&DM) was asked to summarize the results and to include data from the Federal seed orchards (Arkansas, Mississippi, Louisiana, Florida, South Carolina, and North Carolina).

RESULTS

Eight-five percent of the respondents reported use of Furadan®. Of these, 44 percent applied Furadan by means of the Powr-Till Seeder, 31 percent applied Furadan by hand, 13 percent used a fertilizer spreader, and 11 percent used other mechanical devices. Approximately 307,000 pounds of Furadan were used by the responding seed orchards and the Federal seed orchards. Fifteen percent of the respondents reported using Guthion® only, and 10 percent used Guthion in addition to Furadan. One orchard applied Orthene® experimentally as an aerial spray in addition to Furadan, one used DiSyston®, and one used lindane.

DISCUSSION AND RECOMMENDATIONS

There was little change from 1977 to 1978 in the methods used for applying Furadan (46 percent of respondents used the Powr-Till Seeder in 1978 vs 51 percent in 1977). However, companies generally applied Furadan to a larger acreage in 1978 than in 1977 (Hertel 1977).

Evidence of reduced insect control in seed orchards has been noted this past season with some orchards experiencing as high as 60 percent coneworm damage despite treatment with Furadan (Cone and Seed Insect Newsletter 1979). On the International Paper Company orchard (8 Oaks, South Carolina), 62 percent coneworm damage occurred on trees hand treated with 8 ounces Furadan per inch d.b.h. and 39 percent on trees treated with 8 ounces Furadan per inch d.b.h. by means of the John

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Deere Powr-Till Seeder, compared with 67 percent on the check treatment. It is also noted that one-half the orchards on which tests were conducted using Furadan during 1974-75 showed no significant difference between check and Furadan treatments as respects sound seeds produced (DeBarr 1978). Since some failure of control has already been noted and it is possible for target insects to develop resistance to Furadan, monitoring of cone and seed losses to determine if Furadan remains effective is important.

A suggested method for monitoring in pine seed orchards would be to collect 100 percent of the mature cones (damaged and undamaged) from a sample of two ramets of each of six clones. This 12-tree sample would be collected from each a treated and untreated area. An untreated buffer strip of at least 60 feet should be marked off from the treated area to the nearest sample tree in the untreated area. (An untreated area is desirable; however, if an orchard manager cannot leave such an area, assessing damage on the treated area alone would be better than doing nothing). Percent coneworm damage (see pictures in attached Color Guide) should be assessed on collected cones and five apparently sound cones should be sampled from each ramet and subjected to CAS analysis.

An alternative to the above, which would give a broad estimate on seed damage, would be to collect a bulk sample of from 20 to 50 cones from a treated and untreated area in each seed source in the orchard and subject the sample to SOSET analysis. CAS and SOSET (appendix I) analyses are available from the U.S. Forest Service Eastern Tree Seed Laboratory at Macon, Georgia. If an orchard manager prefers to make the analyses himself, procedures are outlined in "Cone Analysis of Southern Pines - A Guidebook" (Bramlett, et al, 1977) (attached).

REFERENCES

- Bramlett, D. L., E. W. Belcher, Jr., G. L. DeBarr, G. D. Hertel, R. P. Karrfalt, C. W. Lantz, T. Miller, K. D. Ware, and H. O. Yates III.
1977. Cone Analysis of Southern Pines - A Guidebook. USDA, For. Serv., SE For. Exp. Sta., Asheville, N. C. and SE Area, S&PF, Atlanta, Ga. Gen. Tech. Rept. SE-13. 28 p.
- DeBarr, Gary L.
1978. Southwide tests of carbofuran for seedbug control in pine seed orchards. USDA, Forest Service, SE For. Exp. Sta. Paper No. 188, 24 p.
- Hertel, G. D.
1977. Use of Furadan during 1977 in southern pine seed orchards. USDA, For. Serv., SE Area, S&PF. Rept. No. 77-2-13.

APPENDIX I

Use of SOSET and CAS

Monitoring techniques provide useful information to the seed orchard manager, which help him to efficiently allocate his time and resources. Seed Orchard Seed Evaluation Testing (SOSET) and Cone Analysis Service (CAS) are two services designed to assist the orchard manager in his monitoring task.

SOSET is a relatively low cost method of measuring differences among clones, treatments or intervals of time. It provides a measure of seed production, viability of the extracted seed and a radiographic analysis of the extracted seed. The radiographic analysis identifies insect problems, abnormal seed development and the percentage of filled seed. This method is considered a continual monitoring technique.

CAS is a relatively high cost method of measuring specific clonal or single tree traits. It provides a radiographic analysis of the seed, a measure of seed production capacity, seed production efficiency, viability of the extracted seed, first and second year seed abortion and the variability of each character. This method is considered a temporary monitoring technique to provide reference material or in-depth evaluation.

To take advantage of the unique features of each of these programs requires a scheme to integrate them. One possible scheme would be to analyze every clone by SOSET as a first step. This would determine the amount and quality of the seed each clone contributes to total orchard production. A general picture of production is, therefore, obtained quickly and at reasonable cost. Then CAS would be applied, beginning with the best and poorest clones, until all clones have been analyzed. The CAS will provide a detailed data base on the orchard's potential seed production and on the possible causes for lost production. This data base will be of value in understanding differences among clones and in making management decisions. Several years would be required to complete CAS on all clones because of time and cost restraints.

There is also a need for continual monitoring with SOSET to detect any changes in production resulting from alterations in management practices, fluctuations in insect populations, or similar factors. This type of monitoring may be accomplished by using the same clones annually. The samples should include several better and several poorer clones so that the full range of seed production is considered. It would begin soon after the initial broad evaluation and be continued for the life of the orchard. Those clones not sampled annually should be tested on some rotating schedule to assure that no problems go undetected.

The exact scheme for long and short term evaluation will depend on the particular objectives and problems at each orchard. Consultation with seed laboratory personnel is always available in developing an appropriate program.

SEED ANALYSIS

ORCHARD _____

Date of Cone Collection _____

Species _____

UNTREATED						TREATED					
		Number of Seed						Number of Seed			
Clone	Ramet	Aborted 1st	Insect 2nd	dam. seed	Empty Sound	Clone	Ramet	Aborted 1st	Insect 2nd	dam. seed	Empty Sound
1.	1.										
	2.										
2	1.										
	2.										
3	1										
	2.										
4	1.										
	2.										
5	1.										
	2.										
6	1.										
	2.										

WHERE TO GET ASSISTANCE

STATE PEST MANAGEMENT SPECIALISTS - 13-State Area of SA

State Cooperator and address	I&D Specialist	Phone Number
Alabama Forestry Comm. 513 Madison Avenue Montgomery, AL 36104	James R. Hyland	205-832-5897
Arkansas Forestry Comm. 3821 W. Roosevelt Road Little Rock, AR 72204	James L. Northum	501-371-1736
Florida Division of Forestry Collins Building Tallahassee, FL 32304	Charles W. Chellman	904-488-7936
Georgia Forestry Comm. P. O. Box 819 Macon, GA 31202	John Godbee	912-744-3241
Kentucky Division of Forestry 207 Holmes St. Frankfort, KY 40601	Richard Dorset	502-564-4496
Louisiana Dept. of Natural Resources Office of Forestry Alexander State Forest Woodworth, LA 71485	Kenny Jeanne	318-445-4511
Mississippi Forestry Comm. 908 Robert E. Lee Bldg. Jackson, MS 39201	Richard J. Collins Joe Cook	601-354-7124
North Carolina Dept. of Natural Resources P. O. Box 27687 Raleigh, NC 27611	Coleman A. Doggett	919-733-4141
Oklahoma Forestry Div. State Board of Agriculture Capitol Bldg. Oklahoma City, OK 73105	Roger Davis	405-521-3886
South Carolina State Comm. of Forestry P. O. Box 21707 Columbia, SC 29202	Mike Remion	803-758-2261

State Cooperator and address	I&D Specialist	Phone Number
Tennessee Division of Forestry 2611 West End Avenue Nashville, TN 37203	Bruce Kauffman	615-741-3326
Texas Forest Service P.O. Box 310 Lufkin, TX 75901	Ronald F. Billings Scott Cameron	713-632-7761
Virginia Division of Forestry P. O. Box 3758 Charlottesville, VA 22903	Caleb Morris	804-977-6555

U. S. FOREST SERVICE, STATE & PRIVATE FORESTRY, FI&DM & EQE
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Area Office and address --

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Catherine Stein	Entomologist

Vacant	Supervisory Pathologist
Charles Affeltranger	Pathologist
Ralph Miller	Pathologist

Alabama

Furadan Applications 1978

Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
MacMillan Bloedel, Inc.	Loblolly	4	2	2	5		Hand
	Loblolly	3	1.5	2	16.6		Hand
	Loblolly	2	1	2	13.6		Hand
	Grafted Mar. '78 →	1	.5	2	7		Hand
	Root Stock for '79→	1	.25	2	.5		Hand
Hammermill Paper Co.	Loblolly	10	9	8	7.5	Aerial application of Orthene (Experimental)	Modified Jacobson Seeder
	Loblolly	9	8	8	15		Modified Jacobson Seeder
	Loblolly	8	7	8	6		Modified Jacobson Seeder
	Loblolly	4	4	8	5		Modified Jacobson Seeder
Container Corp. of America	Slash	6 - 12	8	4	11		Hand & disked in
	Loblolly	4 - 10	8	4	11		Hand & disked in
	Loblolly	1 - 3	1 - 2	4	15		Hand & disked in
Weyerhaeuser Co.	Loblolly	9	10	6	30		John Deere Powr-Till Seeder
	Loblolly	7	8	6	15		John Deere Powr-Till Seeder
Kimberly Clark Corp.	Virginia	20	8 - 12	6	14	Lindane for Dioryctria control	Fertilizer spreader & disked in - also by hand
	Loblolly	18 - 21	10 - 12	6	5.2		" " "
Scott Paper Co.	Slash	6 - 8	8	8	Small scale study < 1	Guthion	Hand & disked in
Ala. Forestry Commission	Loblolly	10	10	8	10	Guthion	Single row application

Arkansas		Furadan Applications 1978					
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Arkansas Forestry Comm.	Shortleaf Loblolly	-	-	-	0	Guthion + DiSyston	
Georgia Pacific Corp.	Loblolly	-	-	-	0	Guthion	
Potlatch Corp.	Loblolly	2	< 1	1.75 oz per tree	43	Guthion	Hand
Ouachita	Shortleaf	10 - 16	5"		0	Guthion	
Arkansas Kraft Corp.					0		

Florida Furadan Applications 1978							
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Gilman Paper Co.	Slash	14	14	6	20		Fertilizer spreader
Fla. Div. of Forestry	-	-	-	-	0	Guthion	
Owens Illinois	Slash	7 - 8	-	8	50 trees		Hand
ITT Rayonier	Slash	18 - 20	12	6 - 8	3.8		Disked in
	Slash	15 - 20	10 - 12	6 - 8	51		Disked in
	Slash	5 - 10	8	6 - 8	26.7		Disked in
St. Regis Paper Co.	Slash	-	-	6	210 trees	Guthion	Hand
Container Corp. of America	Slash	13	9.1	8	18	Guthion	John Deere Powr-Till Seeder
		19	12.8	8	6.4		John Deere Powr-Till Seeder
		19	12.8	8	4.8		John Deere Powr-Till Seeder
ITT Rayonier	Slash	22	13	8	4	Gandy fertilizer distributor & disked in	
	Slash	15	6.5	6	18	Gandy fertilizer distributor & disked in	
	Slash	20	11	8	35	Gandy fertilizer distributor & disked in	
	Slash	16	8	8	20	Gandy fertilizer distributor & disked in	
	Slash	20	12	8	12	Gandy fertilizer distributor & disked in	
	Slash	15	8	8	14	Gandy fertilizer distributor & disked in	
USFS - Ocala	Sandpine	4	2	4	20		Hand
Hudson Pulp & Paper	Slash	-	-	-	0		
St. Joe Paper Co.	Slash				0		

Georgia

Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Brunswick Pulp Land Co.	Slash	17 - 21	14	4	42		John Deere Powr-Till Seeder
	Loblolly	8 - 14	10	4	10		John Deere Powr-Till Seeder
	Loblolly	4	2.3	4	6		John Deere Powr-Till Seeder
	Loblolly	5 - 8	4.5	4	10		John Deere Powr-Till Seeder
Continental Forest Ind.	Loblolly	20	13	8	7.7		John Deere Powr-Till Seeder
	Loblolly	13	8	8	14.8		John Deere Powr-Till Seeder
	Loblolly	12	10	8	11.6		John Deere Powr-Till Seeder
Hiwassee Land Co.	Loblolly	20	10	4 - 6 - 8	11.6		John Deere Powr-Till Seeder
	Loblolly	20	10	4 - 6 - 8	11		John Deere Powr-Till Seeder
	Loblolly	13	7	4 - 6 - 8	5.6		John Deere Powr-Till Seeder
	Loblolly	13	6	4 - 6 - 8	10.3		John Deere Powr-Till Seeder
	Loblolly	10	7	4 - 6 - 8	13.1		John Deere Powr-Till Seeder
	Virginia	13	7	4 - 6 - 8	13.1		John Deere Powr-Till Seeder
Union Camp Corp.	Slash	10 - 21	6 - 24	4	58		John Deere Powr-Till Seeder
	Loblolly	7 - 18	6 - 24	4	42		John Deere Powr-Till Seeder
Georgia Kraft Co.	Loblolly	12	10	6	5		John Deere Powr-Till Seeder
	Loblolly	11	8	6	14		John Deere Powr-Till Seeder
	Loblolly	10	7	6	17		John Deere Powr-Till Seeder
	Loblolly	9	6	6	25		John Deere Powr-Till Seeder
	Loblolly	8	5	6	18		John Deere Powr-Till Seeder
	Loblolly	7	4	6	23		John Deere Powr-Till Seeder
Great Southern Paper Co.	Loblolly	1½ - 2½	1 - 2	4	50		Hand
The Continental Group, Inc.					0		
Sandy Run					0		
(Georgia Forestry Comm.)					16		Hand-disc and harrow
Horseshoe Seed Orchard					6	Guthion	Hand-disc and harrow
(Georgia Forestry Comm.)					2	Guthion	Hand-disc and harrow
Arrowhead Seed Orchard					2	Guthion	Hand-disc and harrow
(Georgia Forestry Comm.)					2	Guthion	Hand-disc and harrow

Louisiana		Furadan Applications 1978					
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
International Paper	Loblolly	19	12	4	72	Guthion	John Deere Powr-Till Seeder
Boise Southern	Loblolly	5	3	4	15		Hand
Olinkraft Inc.	Loblolly	16	15	8	5		Hand and disked in
	Loblolly	8	6	8	5		Hand and disked in
Continental Forest Ind.	Loblolly	18	16 - 18	8	30	Guthion	
Stuart Seed Orchard	Shortleaf	-	-	-	-	Guthion	
	Slash	-	-	-	-	Guthion	
State Orchard		-	-	-	0	None	
Bodcaw		-	-	-	0	None	

Mississippi		Furadan Applications 1978					
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
International Paper Co.	Loblolly	19	12	6	50	Guthion	John Deere Powr-Till Seeder
Miss. Forestry Commission	Loblolly	2	12	1 - 4	50		Hand treated
Erambert	Loblolly		12	4	40		John Deere Powr-Till Seeder
	Slash		10	4	9		John Deere Powr-Till Seeder
	Shortleaf		8	4	4		John Deere Powr-Till Seeder
	Longleaf		7	4	6		John Deere Powr-Till Seeder

North Carolina		Furadan Applications 1978					
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
J. P. Weyerhaeuser	Loblolly	12 - 20	5 - 20	4	153		John Deere Powr-Till Seeder
N.C. Div. of Forest Res.	Loblolly	14	8.6	6	28		Home made tractor-towed applicator
	Longleaf	13	7.0	6	20		Home made tractor-towed applicator
Weyerhaeuser Co.		DiSyston					
Federal Paper Board Co. Inc	Loblolly	16	15	6	23		4' fertilizer spreader & disked in
	Loblolly	8	6.25	6	5		4' fertilizer spreader & disked in
	Slash	16	13.3	6	14		4' fertilizer spreader & disked in
	Longleaf	8	6.25	6	8		4' fertilizer spreader & disked in
Beech Creek	Shortleaf		4.5	4.5	49		John Deere Powr-Till Seeder
	Whitepine		6	4.5	27		John Deere Powr-Till Seeder
	Virginia pine		7	4.5	9		John Deere Powr-Till Seeder
Oklahoma		Furadan Applications 1978					
Okla. State University Forest Genetics Res. Sta.	Loblolly	5 - 12	2 - 10	4	14		Modified subsoiler
	Shortleaf	5 - 12	2 - 8	4	27		Modified subsoiler

South Carolina

Furadan Applications 1978

Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Fulton B. Creek						Guthion	
Westvaco Corp.	Loblolly	14 - 15	12 - 17	8	10.4		John Deere Powr-Till Seeder
	Loblolly	12 - 13	15	8	12.2		John Deere Powr-Till Seeder
	Loblolly	6 - 9	3 - 5	8	10		John Deere Powr-Till Seeder
	Loblolly	7 - 8	3 - 5	8	10.6		John Deere Powr-Till Seeder
	Loblolly	6 - 8	3 - 5	8	10.4		John Deere Powr-Till Seeder
	Va. Pine	6 - 7	3 - 5	4	18		John Deere Powr-Till Seeder
International Paper Co.	Loblolly	16	14.3	8	23	Guthion	John Deere Powr-Till Seeder
Francis Marion	Shortleaf	9	-	-	25	Guthion	--
	Loblolly	9	-	-	70		John Deere Powr-Till Seeder
Creech (S.C. State)	Slash	15	10	6	75		John Deere Powr-Till Seeder
	Loblolly	14	11	6	39		John Deere Powr-Till Seeder
	Loblolly	15	12	8	44		John Deere Powr-Till Seeder
Coastal (S. C. State)	Slash	16	9	8	27		Hand treated

Tennessee							
Furadan Applications 1978							
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Tennessee River Pulp & Paper Co.	Loblolly	14	11	6	12		John Deere Powr-Till Seeder
	Loblolly	10	7	6	70		John Deere Powr-Till Seeder

Texas							
Furadan Applications 1978							
Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
International Paper Co.	Loblolly	8	6	4 and 8	32	Guthion	John Deere Powr-Till Seeder
Owens-Illinois, Inc.	Loblolly Slash	7	5	8	1		Hand
		8	5	8	1		Hand
Temple Eastex	Loblolly	10	5	8	25		Strip method with planter and by hand in dibble holes
Texas Forest Service	Loblolly	7 - 8	6 - 10	8	5		John Deere Powr-Till Seeder

Virginia

Furadan Applications 1978

Company	Pine Species	Age	DBH	Dosage (oz/in dia)	Acres Treated	Other Chemicals	Application Methods
Continental Forest Ind.	Loblolly	20	4" to 14"	6 - 8	19		John Deere Powr-Till Seeder
	Loblolly	18	4" to 14"	6 - 8	19		John Deere Powr-Till Seeder
	Loblolly	16	4" to 14"	6 - 8	10		John Deere Powr-Till Seeder
	Loblolly	14	4" to 14"	6 - 8	8		John Deere Powr-Till Seeder
Va. Div. of Forestry	Loblolly	10 - 15	10 - 16	4	60		John Deere Powr-Till Seeder
	Va. Pine	10	5	4	2		John Deere Powr-Till Seeder
Chesapeake Corp. of Va.	Loblolly	7 - 19	4 - 20	6	47		Barrel on disc harrow with eight outlets